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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/537,290

06/22/2005

Taku Hirayama

2005_0892A

1862

513 7590 05/16/2008

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EXAMINER

LEE, SIN J

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

05/16/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/537,290	Applicant(s) HIRAYAMA ET AL.	
	Examiner Sin J. Lee	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicants canceled claims 1-15.
2. Due to new ground of rejection, the following rejections are made non-final.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 25-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gronbeck et al (US 6,803,171 B2).

Gronbeck teaches silsesquioxane-containing polymers suitable for use in bilayer resist systems (see col.3, lines 22-28). Specifically, in Example 30, Gronbeck teaches a terpolymer containing repeating units of 5% phenylsilsesquioxane, 65% hydroxybenzylsilsesquioxane and 30% t-butoxycarbonato benzylsilsesquioxane (the t-butoxycarbonato group being a photoacid-labile ester group). Gronbeck teaches the equivalence of the photoacid labile ester group and a photoacid labile acetal group such as the one formed by grafting t-butylvinyl ether onto a phenolic hydroxyl moiety (see col.8, lines 44-64 and claim 2). Therefore, it would have been obvious to one skilled in the art to use a terpolymer having repeating units of phenylsilsesquioxane, hydroxybenzylsilsesquioxane and *t-butoxy benzylsilsesquioxane* (present (alkoxyphenylalkyl)silsesquioxane unit of claim 25) as Gronbeck's polymer in his Example 30 with a reasonable expectation of obtaining a bilayer resist that has controlled dissolution rate with little or no loss of photospeed. Thus, Gronbeck's teaching renders obvious present inventions of claims 25 and 27-29.

With respect to present claim 26, Even though Gronbeck's polymer in Example 30 contains 5% phenylsilsesquioxane unit, Gronbeck also teaches that such unit can be present in the amount of 5, 10 or 20-30 or 40-50% based on total units of the polymer (see col.10, lines 22-37). Thus, it would have been obvious to one skilled in the art to use 10% of phenylsilsesquioxane unit in Gronbeck's polymer in his Example 30 with a reasonable expectation of obtaining a bilayer resist that has controlled dissolution rate with little or no loss of photospeed. Therefore, Gronbeck's teaching also renders obvious present invention of claim 26.

5. Claims 16-24 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gronbeck et al (US 6,803,171 B2) in view of Kodama et al (5,891,603).

Gronbeck teaches silsesquioxane-containing polymers suitable for use in bilayer resist systems (see col.3, lines 22-28). Specifically, in Example 30, Gronbeck teaches a terpolymer containing repeating units of phenylsilsesquioxane, hydroxybenzylsilsesquioxane and t-butoxycarbonato benzylsilsesquioxane (the t-butoxycarbonato group being a photoacid-labile ester group). Gronbeck teaches the equivalence of the photoacid labile ester group and a photoacid labile acetal group such as the one formed by grafting t-butylvinyl ether onto a phenolic hydroxyl moiety (see col.8, lines 44-64 and claim 2). Therefore, it would have been obvious to one skilled in the art to use a terpolymer having repeating units of phenylsilsesquioxane, hydroxybenzylsilsesquioxane and *t-butoxy* benzylsilsesquioxane as Gronbeck's polymer in his Example 30 with a reasonable expectation of obtaining a bilayer resist that has controlled dissolution rate with little or no loss of photospeed. Gronbeck's composition

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of Example 30 contains his terpolymer, a photoacid generator and a quencher.

Gronbeck teaches coating his photoimageable composition onto a bottom layer (such as novolac polymer-based resist) which is applied onto a substrate (see col.23, lines 5-21). Gronbeck's photoimageable composition is then exposed and then developed (see col.23, lines 22-51).

Gronbeck's chemically-amplified resist is a two component system, which contains the silsesquioxane resin as described above and a photoacid generator. It is very well known in the art that one can either use two-component system (a resin having acid-decomposable group and a photoacid generator) or three-component system (an alkali soluble resin, a photoacid generator and a dissolution inhibitor) for a chemically amplified positive resist composition. See Kodama, col.2, lines 48-59. It would have been obvious to one skilled in the art to use a terpolymer having repeating units of phenylsilsesquioxane, hydroxybenzylsilsesquioxane and *an non-acid labile alkoxybenzylsilsesquioxane* (instead of the acid labile t-butoxybenzylsilsesquioxane) as Gronbeck's polymer in his Example 30 because it is already known in the art that one can either use two-component system (a resin having acid-decomposable group and a photoacid generator) or three-component system (an alkali soluble resin, a photoacid generator and a dissolution inhibitor) for a chemically amplified positive resist composition. Thus, Gronbeck in view of Kodama would render obvious present inventions of claims 16, 18-24 and 30.

Even though Gronbeck's polymer in Example 30 contains 5% phenylsilsesquioxane unit, Gronbeck also teaches that such unit can be present in the

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amount of 5, 10 or 20-30 or 40-50% based on total units of the polymer (see col.10, lines 22-37). Thus, it would have been obvious to one skilled in the art to use 10% of phenylsilsesquioxane unit in Gronbeck's polymer in his Example 30 with a reasonable expectation of obtaining a bilayer resist that has controlled dissolution rate with little or no loss of photospeed. Therefore, Gronbeck in view of Kodama also renders obvious present inventions of claim 17.

Response to Arguments

6. Applicants argue that present claims are unobvious over Gronbeck because Gronbeck's resin is an alkali insoluble resin whereas present claim requires an alkali soluble resin. For the reasons addressed above in Paragraph 5, the Examiner respectfully disagrees: As stated above, it would have been obvious to one skilled in the art to use a terpolymer having repeating units of phenylsilsesquioxane, hydroxybenzylsilsesquioxane and *an non-acid labile alkoxybenzylsilsesquioxane* (instead of the acid labile t-butoxybenzylsilsesquioxane) as Gronbeck's polymer in his Example 30 because it is already known in the art that one can either use two-component system (a resin having acid-decomposable group and a photoacid generator) or three-component system (an alkali soluble resin, a photoacid generator and a dissolution inhibitor) for a chemically amplified positive resist composition.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/
Primary Examiner, Art Unit 1795
May 12, 2008